(*P. rotundifolia* of Barton). Similarly, in describing his *P. cordata*, Andres compares his plant with *P. americana*, but says that it has the "Blüten . . . *chlorantha*-ähnlich . . . vielleicht nur eine geographische Rasse derselben." While typical *P. chlorantha* in America belongs chiefly in the Canadian region, and var. *paucifolia* primarily to the mountain-slopes of northern New England and adjacent regions, var. *convoluta* is a more southern extreme which does not ascend to noteworthy altitudes.

Gray Herbarium.

NOTES ON POGONIA TRIANTHOPHORA.

Albert E. Lownes.

Of all the *Orchidaceae* found in the region about Asquam Lake, New Hampshire, *Pogonia trianthophora* (Sw.) BSP. is without doubt the most interesting. It was first reported in 1898 when a single station was found. Now there are six known stations, scattered over a comparatively small area, and containing between five and ten thousand plants. An intensive study of the plant began in 1917, and after three years of observation it is possible to note the following facts.

An unusual feature is the close colonial manner of growth, twenty to forty plants occurring within a square foot. These colonies are found in pockets or hollows in beech woods, which are filled with the decaying leaf-mold without soil. Late in July or early August the little pointed tip of the lowest leaf makes its appearance. Under favorable weather conditions the stem lengthens rapidly, and in a week the flowers are borne. The flowers are *erect*, white (rarely pink), the anther deep magenta.

Fertilization, which is rare, is effected by a species of small bee (*Halictus quadrimaculatus*). The bee forces his way into the blossom, hitting the anther as he goes, and loosening but not detaching it. As he backs out, the pollinia adhere to his thorax. The flower then nods and becomes a pale buff color. The seed rarely ripens at Squam Lake.

The plant seems to spread rather by means of the tuberous root system. These tubers are one of the peculiar growths in plant life. They are waxy white in color, translucent, and vary in size from that of a pinhead to three-quarters on an inch in length. They send out slender shoots of variable length. These form new tubers at the end, which in turn send out small shoots of their own. These secondary tubers become separated from the old ones by the decay of the connecting tube and thus a colony is formed. The old tuber dies and the new ones begin to store up nourishment and moisture. A bud appears at the top and eventually a new plant is formed. All this takes time, and a colony found in one place does not reappear for seven or eight years.

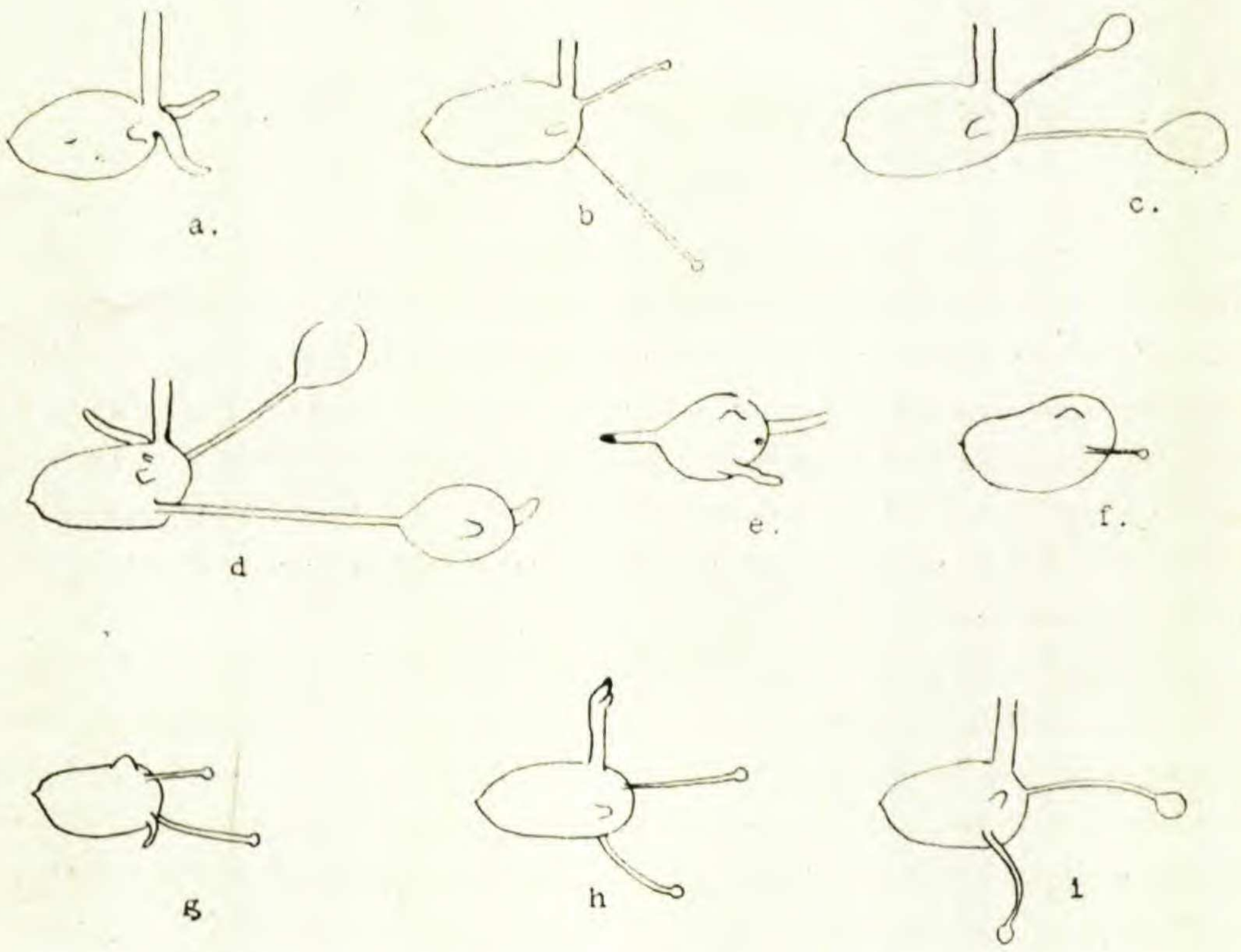

Fig. 1. *a*. Tuber with off-shoots. *b*, *c*. Off-shoots develop small tubers. *d*. Young tubers send out off-shoots. *e*. Young tuber cut off from old one by decay of connecting shoot; bud forms. *f*–*g*. Small tubers form. *h*. Bud begins to grow. *i*. New plant full grown begins to form secondary tubers. Compare with *b*.

An interesting experiment proved that the plant is able to withdraw the moisture from the tubers in time of drought. A colony of the plants was dug up on August 21, 1918, in order to photograph the tubers. It was placed on a table inside a building and left without

water and with the tubers exposed. Two weeks later (September 5) the plants were as fresh as ever, but the tubers had shrunk and shriveled to a fraction of their original size.

The blossoms, which last for three or four days, if not fertilized, open only in clear weather. On cloudy days and to a certain extent at night the flowers close. So far as I know, this is the only one of our native orchids to have this trait. The whole plant, except when it first appears in the bud and the capsule, is erect, and it little merits its common name of Nodding Pogonia.

Providence, Rhode Island.

Scirpus acutus Muhl.—In 1904, Mrs. Chase[1] differentiated in our flora four species which had been passing under the aggregate name *Scirpus lacustris* L., at the same time showing that the Old World plant is unknown from North America. The four species recognized by Mrs. Chase are *S. validus* Vahl., *S. occidentalis* (Wats.) Chase, *S. heterochaetus* Chase and *S. californicus* (C. A. Meyer) Britton. It would seem, however, that in proposing *S. occidentalis* as a new species she overlooked, as her followers have done, the clear description given in Bigelow's *Florula Bostoniensis* of *S. acutus*,[2] a new species ascribed by Bigelow to Muhlenberg. Bigelow's description was based on the plant of Fresh Pond, Cambridge, which was distinguished from *S. validus* (the *S. lacustris* of American authors of his time) by "Spikes . . . oblong and closely imbricate . . . In deep water at Fresh Pond and elsewhere."

Somewhat later, Muhlenberg himself published *S. acutus*,[3] splendidly contrasting it with his *S. lacustris* (*S. validus* of Mrs. Chase's treatment): *S. lacustris* culmo . . . supra attenuato, *S. acutus* culmo . . . supra aequali nec attenuato, pleno maculato, maculis fuscis oblongis; *S. lacustris* spicis . . . ovatis, *S. acutus* spicis . . . oblongis; *S. lacustris* cal. gluma . . . obtusa . . . fusca, *S. acuta* cal. gluma fusca carinata mucronata pubens;

[1] Chase, Rhodora, vi, 65–71, tt. 52, 53 (1904).
[2] Muhl. ex Bigelow, Fl. Bost. 15 (1814).
[3] Muhl. Descr. Gram. 33 (1817).